

The Ohio State University's Library Control System: From Circulation to Subject Access and Authority Control

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THE OHIO STATE UNIVERSITY (OSU) is a large, comprehensive university. The nearly 55,000 students may enroll in eighteen colleges, schools, divisions, and may select from more than 200 majors. The courses are taught by more than 3000 faculty who are assisted by a large number of graduate students. To serve the needs of this large campus, the OSU Libraries' collections are housed in twenty-one department libraries, two undergraduate libraries, and the Thompson Main Library.

In 1967 The Ohio State University Libraries conceptualized an online automated circulation system. The university had experienced a dramatic increase in enrollment from 42,246 in 1963/64 to 55,232 in 1968/69. The main library's McBee keysort circulation system no longer functioned. The library no longer sent overdue notices. One library patron's memory of the libraries' service is summed up in the phrase "not on shelf, not checked out." In addition, the libraries' users were frustrated in their attempts to locate available books in this decentralized library system.

LCS, the Library Control System, went online on 16 November 1970 to provide circulation control for what is now 4 million volumes for 1.9 million titles in the Ohio State University Libraries' collection. In 1979, the State Library of Ohio began using the OSU LCS as its circulation system and online catalog. The OSU Law Library began using the online catalog in 1986.

LCS shares the computing resource of an Amdahl V8 computer with other administrative functions of the university, including computer-based instruction, personnel data records, student records, alumni records, etc. The computer supports approximately 700 terminals of which 213 are dedicated to LCS and 115 to public use terminals. LCS has eight dial access ports for those who wish to access the online catalog via terminals or microcomputers from home or office.

The LCS Design

The initial design of LCS has allowed, even encouraged, the gradual enhancement into an online catalog. The libraries' requirement for the new circulation system was to eliminate the limitations of the decentralized library using the old circulation system. Innovative features included: (1) online updating of circulation transactions which resulted in immediately available current circulation stats; (2) online remote query for known item searches by call number, title, or author/ title; and (3) online access to the entire OSU Libraries shelflist in the short record form. The IBM programmers chose to make LCS modular which has simplified the revision of the system.

LCS was designed as an inventory control system for all titles held by the libraries. The short bibliographic records, now called location records, were converted from the shelflist and later extracted from the OCLC MARC Subscription Service tape records. The location records provide call number, author, title, edition statement, publication date, copies, and holding

locations for each title held by the libraries. These short records, which may be compared to a title entry in a finding list, can be searched and displayed on LCS by author/title, title, author, and call number (the original circulation system has been described in the literature).¹

When the OSU Libraries' administration realized that OCLC would not have a public subject search capability, in 1976 the decision was made to upgrade the LCS short bibliographic records to full records and to provide subject search, which was considered adequate to create an online catalog.² In 1977, the decision was modified to require authority control and *see* and *see also* reference displays before LCS would be considered the online catalog.

The first terminal was made available to the libraries' public in January 1975. Sixteen terminals were available in 1978 when subject access was added to LCS. By July 1981, 115 public-use terminals were available. The OSU Libraries accepted LCS as the online catalog 1 July 1982 and on that date stopped creating and filing new catalog cards for most of the collection.

Early Subject Access

In 1974 LCS was modified to include an index of call numbers assigned to titles entered in the file. This was called the shelf-position index and is searched using the command SPS/. The search displayed records which had the call numbers sequentially adjacent to the entered call number and was used primarily by the copy cataloging staff to shelflist while copy editing on the OCLC cataloging system.

Although the LC classification could not replace completely the subject search provided by the card catalog, several public service librarians used this capability in conjunction with the LCS title search to provide a rudimentary subject access on LCS. The LCS user did a title search using subject words and, if a title was located, the search was continued with a shelf-position search on the call number of the title located. At least one patron created subject access to the OSU collection by using the SPS/ search with a call number secured from an OCLC record. In 1986 approximately 900,000 cataloged titles on LCS continue to have only the location record which does not include subject headings. Thus the shelf-position search is the only "subject" access to these titles. Figure 1 is the current shelf-position search (SPS/) display.

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COMMAND: sps/rm216a7571986

RESPONSE:

DSL/  --CALL NUMBER--  -- AUTHOR --  ----- TITLE -----  DATE  FBL/
1  RM214N983      /      /  Annals of nutrition      1942    1
2  RM214N99      /      /  NUTRITION REVIEWS      1986    3
3  RM215L481986   / Lewis, Clark / Nutrition and nutritional 1981    4
4  RM216A361981   / American Diete / Handbook of clinical diet 1986    5
5  RM216A7571986 / Aronson, Virgi / The dietetic technician 1983    6
6  RM216A76      / Aronson, Virgi / Guidebook for nutrition c 1985    7
7  RM21683641985 / Beck, Mary    / Nutrition and dietetics f 1938
8  RM216842      / BELFRAGE, MARY / FACTS ABOUT FOOD        1968
9  RM216844      / BENDER, ARDIS / DIETETIC FOODS.

MORE: PG+      BACK: PG-
FOR LOCATION, ENTER: DSL/number      FOR FULL CATALOG RECORD, ENTER: FBL/number
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Figure 1. Shelf-position Search Display

LCS Subject Index

The 1976 specifications for the LCS subject search used the OSU Libraries card catalog as

a model but in a divided form. Thus the subject search uses the complete subject headings as assigned to titles according to the *Library of Congress Subject Headings* (LCSH). At the time the specifications were written, no online catalogs existed with subject access which could be emulated, and the OSU Libraries chose not to devote the personnel and time to design a new type of subject search. The eight-page requirements document was created by one librarian and one programmer in just over one month.

The LCS subject file was created in June 1978 by extracting the subject headings (fields tagged 6xx) from the full catalog records on LCS. (The original subjects were from the records cataloged by OSU on OCLC from January 1974 to June 1978 and received on the OCLC MARC Subscription Service which was applied to the LCS location records to secure the full catalog records.) A "sort form" was created for each subject by converting all lowercase characters to uppercase and by dropping punctuation and extra spaces. The subjects were then sorted, and each unique subject was assigned a number which replaced the subject in each of the appropriate catalog records. (Each subdivided subject was considered a unique subject.) At the same time, the title number of each catalog record that was assigned the subject was linked to the subject record which allows the global change of a subject in the online catalog. The 1984 addition of the *see* and *see also* references to the index will be discussed later.

LCS Subject Search

When a subject search is desired, the user enters the three character command SUB/, which specifies a search transaction and qualifies the type of search followed by the desired subject. The subject requested may be a full subject heading, the initial part of the subject heading, or a word of interest. The user who enters the subject heading or the first part of a subject heading is likely to be more successful than the user who types just any word. The subject search request displays an alphabetical segment of the subject index beginning with the subject requested (see fig. 2). The requested term appears on line one followed by subjects that fall alphabetically after the desired subject and which are often subdivided versions of the same heading. The number of items to which the subject is assigned precedes the subject heading on each display line. The prompt on the next to the last line "MORE: PS+ BACK: PS—" instructs the user how to browse the subject index.

```

COMMAND: sub/nutrition

RESPONSE:

TBL/ ITEMS ----- SUBJECTS ----- SAL/
1      764 Nutrition
2        7 Nutrition--ABSTRACTS
3        3 Nutrition--Abstracts--Periodicals
          Nutrition--Aging effect
5          SEARCH UNDER: Aging--Nutritional aspects
6        6 Nutrition and dental health                                6
7        2 Nutrition and dental health--United States
          Nutrition and state
9          SEARCH UNDER: Nutrition policy
MORE: PS+   BACK: PS-   FOR TITLES, ENTER: TBL/number
FOR NOTES OR RELATED SUBJECTS (ONLY WHEN NUMBER IS AT RIGHT), ENTER: SAL/number

```

Figure 2. LCS Subject Index Display

The cataloging staff may modify the search to secure a display (see fig. 3) which has more information than the public display. The "heading number" assigned to each heading is shown preceding the subject. It is these numbers which are stored in the catalog record to identify the text of the associated subject. These numbers also link the catalog record to the heading in the subject index display. An asterisk preceding a heading indicates that it has not been verified by a cataloger as "correct." Specifying the status of the heading was necessary because many of the records added to the LCS files had been created long before the completion of the *Anglo-American Cataloging Rules*, second edition (AACR2) and the creation of the LCS subject index.

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Command:  sub/nutrition/all

Response:

TBL/ ITEMS      ----- SUBJECTS ----- SAL/
1    764      264  Nutrition                                     1
2     7      23019 * Nutrition--ABSTRACTS
3     3      1384247 * Nutrition--Abstracts--Periodicals
                        1853888  Nutrition--Aging effect
5                        116337  SEARCH UNDER: Aging--Nutritional aspects
6     6      106473  Nutrition and dental health                                     6
7     2      1935136  Nutrition and dental health--United States
                        1885787  Nutrition and state
9                        5218   SEARCH UNDER: Nutrition policy
MORE: PS+      BACK: PS-      FOR TITLES, ENTER: TBL/number
FOR NOTES OR RELATED SUBJECTS (ONLY WHEN NUMBER IS AT RIGHT), ENTER: SAL/number

```

Figure 3. LCS Staff Authority Index Display

The original 1978 design was similar to Dialog's EXPAND or SDC's NEIGHBOR commands which display a segment of an alphabetical file before and after the entered term (see fig. 4). This display compensated for the errors in the subject headings that were present due to the benign neglect of the OCLC records on the archive tape and illustrated the organization of the file. The proposal to change this display was made after observing that users often were confused when the subject they typed was not the first subject displayed. Many of the incorrect subject headings had been corrected between 1978 and 1986 thus reducing the need to see the subject which immediately precedes the one entered.

```

COMMAND:  sub/nutrition

RESPONSE:

01
02      Nutrient supplements
03      SEARCH UNDER: Dietary supplements
04      1 Nutriles.
05      764 Nutrition      *(SEE BELOW)
06      7 Nutrition--ABSTRACTS
07      3 Nutrition--Periodicals
08      38 Nutrition--Addresses, essays, lectures
09      Nutrition--Aging effect
10      SEARCH UNDER: Aging--Nutritional aspects
ENTER TBL/line no. FOR TITLES. *ENTER SAL/line no. FOR MORE INFORMATION.
ENTER PS- FOR PRECEDING PAGE; ENTER PS+ FOR NEXT PAGE.

```

Figure 4. Original LCS Subject Index Display

The design staff considered providing a search which would bypass the subject index and would respond with a list of titles with the specified subject heading. However, three reasons not to provide this capability were identified: (1) it was thought that the user would be unlikely to enter the precise subject, (2) the number of incorrect subjects due to typographical errors in the old records would restrict patron access to these records, and (3) the library patron should be aware of the subdivided subjects that can be a valuable resource. This last reason was associated with the inability to determine how to include the titles associated with the subdivided subject headings with the undivided subject in a clear, efficient manner for both the user and the system.

The titles to which the subject is assigned are viewed by entering the three character command TBL/. The titles are sequenced by date of publication in reverse chronological order and then by title (see fig. 5). Arranging the titles by date was selected over an alphabetical arrangement by author since it has been shown that within a subject area library users frequently select by publication date.³

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COMMAND: tbl/1

RESPONSE:

SUB/Nutrition
DSL/  LIB  -----  1-8 OF 764 TITLES  -----  --AUTHOR--  DATE FBL/
1      OSU  The dietetic technician : effective nutritio  Aronson, V  1986  1
2      SL   Eat to succeed : the Haas maximum performanc  Haas, Robe  1986  2
3      OSU  Essentials of nutrition and diet therapy /    Williams,   1986  3
4      OSU  Food and nutrition : customs and culture      Fieldhouse  1986  4
5      OSU  Foundations of normal and therapeutic nutriti  Lankford,   1986  5
6      OSU  How to live longer and feel better            Wing, Lawr   1986  6
7      OSU  Mollen method : a 30-day program to life      Mollen, Ar   1986  7
8      OSU  Normal and therapeutic nutrition /            1986  8
MORE: PG+                                TO RETURN TO SUBJECTS, ENTER: PS1
FOR LOCATION, ENTER: DSL/number          FOR FULL CATALOG RECORD, ENTER: FBL/number

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Figure 5. Display of Titles for a Subject Heading

The user may then search by line number to view the location record with circulation status of the items (see fig. 6) or the full catalog record (see fig. 7) which will provide alternative subject headings and the call number for browsing with the shelf-position search.

```

Command:  ds1/1

Response:

CALL NUMBER: RM216A7571986
AUTHOR: Aronson, Virginia
TITLE: The dietetic technician :
       effective nutrition counseling
DATE: 1986

LINE LOCATION COPY  LOAN  STATUS
1  HOM          1  3wk  available
PAGE 1          END
FULL CATALOG INFO: FBL/1

```

Figure 6. LCS Location Record

```
Command: fb1/1

Response:

RM216A7571986
Aronson, Virginia.
  The dietetic technician : effective nutrition counseling / Virginia Aronson.
  Westport, Conn. : AVI Pub. Co., c1986. xii, 430 p. : ill. ; 29 cm.
  Bibliography: p. 416-421. Includes index.
SUB: 1. Diet therapy 2. Nutrition
LC CARD #: 85-6110 TITLE #: 3745194 OCLC #: 11918178 &lq860618
PAGE 1 END
```

Figure 7. Full Catalog Record

Adding Subject Authority

In December 1981 the subject index was modified to allow the display of "see" references and to include author, uniform title, and series headings.⁴ At this same time the record was expanded to include fields necessary to identify the type of heading, the fields necessary for authority control, and the fields to specify and qualify the links to the "see references" and to the headings that had a "see also" and/or "see also from" relationship.

The updating of these expanded records was completed primarily from processing the Library of Congress subject and name authority master tapes.⁵ The LCS-created "sort form" for each heading on the LC authority tapes was compared to the "sort form" for the LCS headings. When an LC heading was found on LCS, the LC authority record was edited and added to the LCS record. LCS now includes 2 million assigned name, subject, series, and uniform title headings of which 621,737 are assigned subject headings. An assigned heading is considered "verified" if it is in AACR2 form or if it conforms to LCSH. Of the assigned subject headings, 54 percent (336,168) are "verified." Of all assigned subject headings, 41,214 or 6.6 percent were "verified" using the Library of Congress subject authority master for September 1981.⁶ In addition, 70,576 "see also" links and 48,737 "see" references were added to LCS from the 1981 subject master.⁷

All new headings from new OCLC cataloging performed by the Library of Congress or the OSU Libraries are added to the headings file as "verified" headings. At this time very few "see" references and "see also" heading links are added to LCS under the assumption that new LC authority tapes will be processed against LCS in the future. The "see" references and "see also" links which are not expected from the Library of Congress authority tapes are added to LCS by staff in the cataloging department. Although the programming request has been written to process more recent LC authority tapes, other LCS projects have been given priority. The "see" references—which are labeled "SEARCH UNDER."—display in the subject index in the alphabetically correct sequence (see fig. 2).

The LCS subject search was designed so that the user could enter any desired subject and receive a response. The examples which are included with this article illustrate only searches that matched the LC subject heading exactly. If the requested term is not located in the subject index, the response on line 1 includes the note "NOTHING WAS FOUND UNDER:" followed by the

requested term. The subjects on the preceding page and those subjects and/or "see references" following in the display are alphabetically adjacent to the requested term. Thus, the user receives a response which will encourage the evaluation of the typed request as it relates to the subjects around it. Frequently, a desired subject appears on the same screen, and the user searches the more relevant or correct subject.

The LCS user may request the list of titles associated with a subject by entering the TBL/ command followed by the line number in front of the "SEARCH UNDER" reference. However, this will not provide the opportunity to view the subdivided subjects that are available in the index in the alphabetically correct location for the subject heading (see fig. 8).

The "see also" references, notes, and suggested classification numbers are displayed only when the user requests them by entering the command SAL/ followed by the line number of the subject for which related subjects are desired (see fig. 2 leading to fig. 9). In this display, the number of titles associated with each "see also" heading (excluding the titles associated with subdivided versions of the heading) is provided to the right of each subject. The user must enter a new subject search if one of the "see also" subjects is of interest. The Libraries' Committee for an On-line Catalog is currently reviewing the content and format of the SAL/ display for possible revision.

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COMMAND: sub/aging--nutritional aspects

RESPONSE:

TBL/ ITEMS ----- SUBJECTS ----- SAL/
1      17 Aging--Nutritional aspects                               1
2      3 Aging--Nutritional aspects--Bibliography.
3      4 AGING--NUTRITIONAL ASPECTS--CONGRESSES
4      10 Aging--Periodicals
        Aging persons
6      SEARCH UNDER: Aged
7      2 Aging--INDEXES
8      1 Aging--Juvenile literature
9      1 Aging--Longitudinal studies.

MORE: PS+   BACK: PS-   FOR TITLES, ENTER: TBL/number
FOR NOTES OR RELATED SUBJECTS (ONLY WHEN NUMBER IS AT RIGHT), ENTER: SAL/number

```

Figure 8. LCS Subject Index Display

What fields should be displayed to the libraries' users and in what order was discussed at length. The interest that many users have shown in "browsing the shelves" and the normal brevity of that field resulted in displaying it first along with the prompt "(SEARCH WITH SPS/)". The subjects that have a "see also" relationship are displayed next, because they were included in the OSU Libraries' card catalog. The "see also" notes followed. The subjects that had a "see also from" relationship were omitted from the public display because the repetition of the same subject in two separate sequences would be confusing, and the librarians did not want the "see also" and "see also from" headings interfiled because they used the distinction in their work. No consideration was given to including the "see" references in the public display. All of the fields in the authority record are available to the staff by modifying the search request. The cataloger's version of the display in figure 9 is in the appendix.

```

COMMAND: sal/1

RESPONSE:

Nutrition
POSSIBLE BROWSING NUMBER(S): Home economics, TX341-641; Personal hygiene
RA7B4: Physiology, QP141-185.3 (SEARCH WITH SPS/)
SEARCH ALSO UNDER:
  Absorption (Physiology) (12 TITLES)
  Amino acids in human nutrition (1 TITLE)
  Animal nutrition (76 TITLES)
  Antibiotics in nutrition (3 TITLES)
  Chromium in human nutrition
  Deficiency diseases (15 TITLES)
PAGE 1. MORE: PG+          TO RETURN TO SUBJECTS, ENTER: PS1

Nutrition
SEARCH ALSO UNDER:
  Diet (224 TITLES)
  Dietary supplements (12 TITLES)
  Digestion (30 TITLES)
  Elemental diet (1 TITLE)
  Food (298 TITLES)
  Food habits (73 TITLES)
  Food preferences (7 TITLES)
  Lipids in nutrition (7 TITLES)
PAGE 2. MORE: PG+ BACK: PG-    TO RETURN TO SUBJECTS, ENTER: PS1

. . .

Nutrition
SEARCH ALSO UNDER:
  Vitamins (51 TITLES)
  Vitamins in human nutrition (26 TITLES)
SEARCH ALSO UNDER: Subdivision Nutrition under subjects, e.g. Astronauts--
  Nutrition; also subdivision Nutritional aspects under diseases, e.g.
  Nutritional aspects
PAGE 5.          BACK: PG-    TO RETURN TO SUBJECTS, ENTER: PS1

```

Figure 9. Public Search Also Under Display

Use of Subject Search

Although the initial library policy was not to promote the subject search, within one year, by June 1979, Norden and Lawrence reported that subject searches were 9.3 percent of the searches of choice. Those transactions which specified a type of search—e.g., author, subject, title—were defined as searches of choice.⁸ In 1985/86, the 868,800 subject searches accounted for 30 percent of the searches of choice at the public search terminals. In 1985/86, 129,300 SAL/commands ("Search also" searches) were entered from the public search terminals.

In their survey of users of the LCS subject search, Ludy and Van Pulis have determined that the search the user entered found an exact or close match 69 percent of the time. For 13 percent of the searches entered, a "SEARCH UNDER." reference was displayed. The inclusion of the "see" and "see also" structure has increased the success rate of the subject searches to 82 percent.⁹

Evaluation

Although the LCS subject search uses the same vocabulary as the card catalog—i.e., the *Library of Congress Subject Headings*—the LCS subject search is an improvement over the card catalog. LCS ignores punctuation such as parentheses and commas so that a user is not required to be aware of the punctuation or to enter these correctly. If the punctuation is entered, it is ignored by LCS. Users can move around the alphabet changing their minds about the subject. Once a subject display has been retrieved, the users may browse forward or backward following the prompts at the bottom of the screen to identify the desired heading, and the users frequently enter the page-turning commands to browse the list of headings. LCS indicates the number of titles to which the heading was assigned. A list of titles can be requested by entering the line number of the "see" reference with the same ease that the titles can be selected from the actual heading.

The subject searches (SUB/) on LCS average .31 of a second in the central processing unit. The request to list the titles associated (TBL/) with a subject average .38 of a second per request. The request to view the "search also under" headings (SAL/) averages .45 of a second per request. This minimal use of the computer resource, considering the number of subject searches performed and the total activity on LCS, is important. The quick responses are especially important for the OSU Libraries and such response occurs in part because the LCS subject search is not a Boolean search.

Future Enhancements

What does the future hold for improving LCS subject access? The first enhancement should be to identify from the transaction log the subject searches that responded with no titles. These requests would be examined by a cataloger and added, if appropriate, as additional references to established subject headings.

A second enhancement would be automatically to manipulate the search if no heading or reference is found that matches the request. This modification would be of two kinds. First, LCS could invert the entered words and retry the search, thus "History of the United States" would locate a successful heading under "United States, History of the." If the inversion was not successful, then passing the entered words against a database to check spelling might be appropriate.

Conclusion

The OSU Libraries online catalog subject access has roots in the card catalog. Technology has been applied to enhance the card catalog capabilities in subject searches of a decentralized library's online catalog. OSU Libraries will observe and evaluate online catalogs in other libraries with similar activity levels to identify enhancements for LCS that will improve subject searches for the libraries' users.

Appendix

LCS Authority Display (or Staff Search Also Under Display)

Nutrition 264
12 SEE ALSO:
13 1391706 Survival and emergency rations (2)
14 48772 Trace elements in nutrition (12)
15 147016 Unsaturated fatty acids in human nutrition (2)
16 190247 Vitamin D in human nutrition (1)
17 56677 Vitamins (51)
18 46758 Vitamins in human nutrition (26)
19 (360) subdivision Nutrition under subjects, e.g. Astronauts--Nutrition;
also subdivision Nutritional aspects under diseases, e.g. Cancer--
PG2. ENTER PG1 FOR PRECEDING PAGE; ENTER PG3 FOR NEXT PAGE.

Nutrition 264
(360) Nutritional aspects; Cardiovascular system--Diseases--Nutritional
aspects
24 SEE ALSO FROM: 10
25 63969 Deficiency diseases (15)
26 1263 Diet (224)
27 25466 Digestion (30)
28 10219 Food (298)
29 1207 Food habits (73)
30 30451 Health (210)
PG3. ENTER PG2 FOR PRECEDING PAGE; ENTER PG+ FOR NEXT PAGE.

Nutrition 264
02 SEE ALSO FROM:
03 9361 Metabolism (94)
04 1656134 Orthomolecular therapy (12)
05 13388 Physiology (196)
06 4515 Therapeutics (70)
PG1 END. ENTER PG- FOR PRECEDING PAGE.

Nutrition (1981)
02 264 SUB: 764
03 (053) Home economics, TX341-641; Personal hygiene, RA784; Physiology, QP141-
185.3
05 SEE FROM: 2
06 1885779 Alimentation
07 1866227 Dietetics
08 SEE ALSO: 32
09 55441 Absorption (Physiology) (12)
10 1854852 Amino acids in human nutrition (1)
PG1. ENTER PG2 FOR NEXT PAGE.

Nutrition 264
12 SEE ALSO:
13 4403 Animal nutrition (76)
14 197866 Antibiotics in nutrition (3)
15 230056 Chromium in human nutrition (1)
16 63969 Deficiency diseases (15)
17 1263 Diet (224)
18 280590 Dietary supplements (12)
19 25466 Digestion (30)
20 1800283 Elemental diet (1)
PG2. ENTER PG1 FOR PRECEDING PAGE; ENTER PG3 FOR NEXT PAGE.

Nutrition 264
 22 SEE ALSO:
 23 10219 Food (298)
 24 1207 Food habits (73)
 25 160318 Food preferences (7)
 26 8796 Lipids in nutrition (7)
 27 22690 Malnutrition (53)
 28 9361 Metabolism (94)
 29 112670 Milk as food (6)
 30 1370244 Minerals in nutrition (2)
 PG3. ENTER PG2 FOR PRECEDING PAGE, ENTER PG+ FOR NEXT PAGE.

Nutrition 264
 02 SEE ALSO:
 03 56678 Minerals in the body (12)
 04 30015 Parenteral feeding (19)
 05 6823 Proteins in human nutrition (18)
 06 1660956 Selenium in human nutrition (2)
 07 127812 Soils and nutrition (2)
 08 248516 Sugars in human nutrition (1)
 09 14549 Sulphur in nutrition (2)
 10 191793 Surgery—Nutritional aspects (4)
 PG1. ENTER PG- FOR PRECEDING PAGE, ENTER PG2 FOR NEXT PAGE.

References

1. Ohio State University Libraries. *An Automated On-Line Circulation System: Evaluation, Development, Use*, edited by Irene Braden Hoadley and A. Robert Thorson. Columbus: The Ohio State University Libraries, 1973; and Thorson, A. Robert. "Tomorrow's Library Today." *Theory Into Practice* 12(June 1973): 191-95.
2. Miller, Susan L. "The Evolution of an On-line Catalog." In *New Horizons for Academic Libraries*, edited by Robert D. Stueart and Richard D. Johnson, pp. 193-204. New York: K.G. Saur Publishing, 1979.
3. Mostecky, V., ed. *Catalog Use Study*. Chicago: ALA, 1958, p. 35.
4. Ludy, Lorene E., and Logan, Susan J. "Integrating Authority Control in an Online Catalog." In *Proceedings of the 45th ASIS Annual Meeting*, edited by Anthony E. Petrarca, pp. 176-78. White Plains, N.Y.: Knowledge Industry Publications, 1982.
5. Ludy, Lorene E. "LC Name Authority Tapes Used by Ohio State University Libraries." *Information Technology and Libraries* 3(March 1984):69-71; and _____ "OSU Libraries' Use of Library of Congress Subject Authorities File." *Information Technology & Libraries* 4(June 1985):155-60.
6. _____, "OSU Libraries' Use of Library of Congress Subject Authorities File," p. 160.
7. Ibid.
8. Norden, David J., and Lawrence, Gail Herndon. "Public Terminal Use in an Online Catalog: Some Preliminary Results." *College & Research Libraries* 42(July 1981):308-16.
9. Ludy, Lorene E., and Van Pulis, Noelle. "Subject Searching in an Online Catalog with Authority Control." (In preparation. Contact the authors at The Ohio State University.)